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(possibly an enzyme produced only in light), which is not operative in cucurbitaceous seeds, but is active in etiolated leaves.

Perhaps other so-called chlorophyll originating in the dark will prove to be only this forerunner of chlorophyll. The authors will continue their further researches together. Out of 800 species in 110 families observed, they have found chlorophyllogen in representatives of 18 families.—C. R. B.

Nucleoli in Marsilia.—To prove whether or not there is any transfer of chromatin substance into nucleoli and vice versa, BERGHS[19] has studied vegetative mitosis in the root and prothallium of *Marsilia macra* and *M. Drummondii.* A peculiar condition of the nucleolus in Marsilia was described two years ago by STRASBURGER. The resting nucleus in these species generally contains a single conspicuous nucleolus, which always takes stains deeply, and at a certain stage almost all of the stained substances are found only in the nucleolus. BERGHS, after following the whole processes of vegetative mitosis in the meristem of the root and in the young prothallium, gives the following results. The nucleolus is achromatophile at the moment of its appearance, and afterward becomes more and more chromatophile; at the same time the chromatin network loses its chromatin and decreases in size. The chromatin network in the resting nucleus certainly does not contain the total substance of the definite chromosomes, and in the prophase the nucleolus loses chromatin matter during the formation of chromosomes. The fact that the nucleolus is formed as an achromatic substratum and becomes impregnated with chromatin material during the resting stage, the author believes, indicates a transfer of chromatin material between the nucleolus and chromosomes.—SHIGÉO YAMANOUCHI.

Development of Aeginetia.—The morphology and anatomy of *Aeginetia indica* were described by KUSANO a few years ago, but he found nothing peculiar which would distinguish it from Orobanche. But it does show interesting features in its germination and early growth, which he describes in a recent paper.[20] The short-lived seeds germinate only under stimulation by some substance or substances arising from the roots of vascular plants, and the development of the seedling takes place only on certain species of monocotyledons. The first sign of germination is the appearance of large globular cells at the radicular end of the embryo, from several of which develop hairs, sometimes a millimeter in length, that protrude in all directions. When they come into contact with the host root, they attach themselves (by slight insertion or cement?), and then coil irregularly, thus drawing the embryo close to the host. These tendril-like hairs KUSANO calls hair-tendrils. If the host be suitable the seedling develops a tubercular body, from which arises the primary haustorium. This secures nutriment from the host, making possible later the development of a stem and root system, which arise much as in Orobanche.

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[19] BERGHS, J., Les cinèses somatiques dans le Marsilia. La cellule **25**:73–84. *pl. 1.* 1908.

[20] KUSANO, S., Further studies on *Aeginetia indica.* Bull. Coll. Agric. Tokyo Imp. Univ. **8**:1–20 (?). *pl. 7.* 1908.

The stimulus to this development is quite other than that for the hair-tendrils. The latter, according to the author, have not been discovered heretofore in any seed plant.—C. R. B.

Phylogeny of the embryo-sac and double fertilization.—PORSCH [21] attempts to explain the usual eight-nucleate embryo sac of the angiosperms as an extreme reduction from the gymnosperm type, consisting of two reduced archegonia, the egg apparatus and the upper polar nucleus representing one archegonium, and the three antipodals with the lower polar nucleus representing the other. The egg apparatus is regarded as made up of an egg, two neck cells (the synergids), and a ventral canal cell (the upper polar nucleus). The antipodal complex is interpreted in the same way. Then double fertilization might be an attempt to fertilize both archegonia.

While a combination of all the features presented by gymnosperm and angiosperm gametophytes can be arranged in such a sequence, the reviewer does not believe that there is anything phylogenetic in it. Though the angiosperm embryo sac has doubtless come through stages in which there was a tissue with archegonia, we do not believe that any part of the archegonium, except the egg itself, has been retained.—CHARLES J. CHAMBERLAIN.

Chemotaxis of Lycopodium sperms.—BRUCHMANN'S discovery that the sperms of Lycopodium are sensitive to citric acid and its salts is a disturbing factor in SHIBATA'S generalization that the chemotactic sensitiveness of the three great pteridophyte lines toward malic acid approves the theory of their monophyletic origin. Yet BRUCHMANN, apparently not sensing the humor of this idea, gravely softens the blow by suggesting that this aberrant behavior of the Lycopodium sperms does not place the lycopods outside this line of descent, but is to be explained by the saprophytic character of the odd gametophyte![22] He shows that malic acid is not responded to, and that saccharose, glucose, lactose, albumin and other proteins, acetic, oxalic, formic, and butyric acids are likewise ineffective. But to citric acid 1:1,000,000, and to its alkali salts in 1:100,000, the sperms respond positively, the reaction becoming negative at 1:1000 and 1:100 respectively. Acids and alkalies proved repulsive, as in the case of other sperms. The Weber law was found to be valid, with the ratio 1:30–40.—C. R. B.

Geotropic perception.—NEWCOMBE, after criticizing again the weakness of the experiments for the localization of geoperception, has used the old decapitation method for demonstrating that in some species as much as 4 or 5^{mm} of the root tip is capable of perceiving the gravity stimulus.[23] He is unable to relate the

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[21] PORSCH, OTTO, Versuch einer phylogenetischen Erklärung des Embryosackes und der doppelten Befruchtung der Angiospermen. Vortrag gehalten auf der 79. Versammlung deutscher Naturforscher und Aertzte in Dresden am 16. Sept. 1907. pp. 1–49. 14 text figures.

[22] BRUCHMANN, H., Von der Chemotaxis der Lycopodium-Spermatozoiden. Flora **99**:193–202. 1909.

[23] NEWCOMBE, F. W., Gravitation sensitiveness not confined to apex of root. Beih. Bot. Centralbl. **24**:96–110. *pl. 3. figs. 6.* 1908.